

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An image processing apparatus for outputting image data for displaying a desired 3D-shape composed of a plurality of polygons, comprising:

storage locations for storing vector data defining a regular polyhedron which has a centroid at an arbitrary point in a space and each of whose faces is divided into a plurality of polygons and representing directions from the centroid toward vertices of the plurality of polygons, and for storing distance data for setting distances between the centroid and the vertices of the plurality of polygons of the desired 3D-shape,

a reading mechanism for reading the vector data and the distance data from the storage locations, and

an image data outputting processing mechanism for outputting image data for displaying an image of the desired 3D-shape such that the vertices of the plurality of polygons of the desired 3D-shape are points which are, from the centroid, at distances based on the distance data and in directions based on the vector data read from the reading mechanism.
2. (Original) The image processing apparatus according to claim 1,

wherein the plurality of polygons into which each face of the regular polyhedron is divided have the same size and shape.
3. (Original) The image processing apparatus according to claim 1,

wherein the regular polyhedron is a regular octahedron.

4. (Currently Amended) The image processing apparatus according to claim 1, further comprising a contact determination processing mechanism for making, based on a distance of another object from the centroid and a distance from the centroid of a polygon to be subjected to contact processing on the desired 3D-shape, a contact determination between the desired 3D-shape and the other object.

5. (Previously Presented) A program to be executed by a computer which is, for outputting image data for displaying a desired 3D-shape composed of a plurality of polygons, capable of reading data from storage locations for storing vector data defining a regular polyhedron which has a centroid at an arbitrary point in a space and each of whose faces is divided into a plurality of polygons and representing directions from the centroid toward vertices of the plurality of polygons, and for storing distance data for setting distances between the centroid and the vertices of the plurality of polygons of the desired 3D-shape, comprising:

a step of reading the vector data and the distance data from the storage locations, and

a step of outputting image data for displaying an image of the desired 3D-shape such that the vertices of the plurality of polygons of the desired 3D-shape are points which are, from the centroid, at distances based on the distance data read and in directions based on the vector data read.

6. (Original) The program according to claim 5,

wherein the plurality of polygons into which each face of the regular polyhedron is divided have the same size and shape.

7. (Original) The program according to claim 5,
wherein the regular polyhedron is a regular octahedron.

8. (Original) The program according to claim 5,
further comprising a step of making, based on a distance of another object from the centroid and a distance from the centroid of a polygon to be subjected to contact processing on the desired 3D-shape, a contact determination between the desired 3D-shape and the other object.

9. (Original) The program according to claim 8,
wherein the step of making a contact determination comprises:
a step of selecting, based on signs of space coordinate values of the other object, a face area of the regular polyhedron which includes a polygon to be subjected to contact processing,

a step of identifying the polygon to be subjected to contact processing from within the selected face area, by using a plane equation obtained from the distance data,
and

a step of determining contact between the other object and the desired 3D-shape by comparing a distance of the identified polygon from the centroid and a distance of the other object from the centroid.

10. (Previously Presented) A recording medium for recording a program to be executed by a computer for displaying a desired 3D-shape composed of a plurality of polygons, and data, wherein the recording medium has recorded thereon:

vector data defining a regular polyhedron which has a centroid at an arbitrary point in a space and each of whose faces is divided into a plurality of polygons and representing directions from the centroid toward vertices of the plurality of polygons,

distance data for setting distances between the centroid and the vertices of the plurality of polygons of the desired 3D-shape,

a program for reading the vector data and the distance data from the storage locations, and

a program for outputting image data for displaying an image of the desired 3D-shape such that the vertices of the plurality of polygons of the desired 3D-shape are points which are, from the centroid, at distances based on the distance data read and in directions based on the vector data read.